UTILIZATION OF SELECTED MEDICAL SERVICES IN THE NORTHEASTERN COASTAL PLAINS OF NORTH CAROLINA

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Rural household access to medical services in an 8-county, North Carolina area was measured against State and national health service data. Household utilization was compared, using selected household characteristics such as income, number of household members, and age, sex, and educational level of the head of household. An increase in household income tended to increase medical utilization only slightly. Results of the survey showed that 90 percent of the 2,118 households utilized the services of a general practitioner, 53 percent saw a medical specialist, and 63 percent visited a dentist at least once during 1974. A greater percentage of White and high-income households utilized these services than did minority or low-income households.

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SUMMARY

Household access to medical services, measured by utilization of medical services in a rural area in the South, was examined. The main objective was to determine which of several factors affected utilization, with the hypothesis that inequalities would be readily apparent for those who were rural, of a minority race, and economically poor.

This study deviates from other studies by examining utilization in a household context. If income is a constraint in obtaining medical services, the use of such services by individuals must somehow be allocated by the household.

Results of 2,118 households surveyed show that 90 percent utilized the services of a general practitioner (GP), 53 percent used the services of a medical specialist, and 63 percent used the services of a dentist at least once during 1974. A greater percentage of White and high-income households utilized these services than did Black and other or low-income households.

In general, there were more people to be served by medical personnel, fewer hospital beds, and fewer outpatient services in the study area than the average for either the State of North Carolina or the United States. Based on national data, the implied health needs for the study area are probably higher than average for either the State or the United States.

Multiple regression was used to account for the interactions between household utilization and selected household characteristics, such as: household income; age, educational level, and sex of the head of household; and number of persons in the household. The study showed that household utilization of medical services increased with household income, but a large change in income would be required to produce a small change in utilization when other household characteristics were considered.

The results of this study should be particularly useful to consumers and providers in health system agencies. Additional surveys may be necessary to provide greater insight into the apparent differences in services used by minority households in the study area.

UTILIZATION OF SELECTED MEDICAL SERVICES IN THE NORTHEASTERN COASTAL PLAINS OF NORTH CAROLINA

by

Leon B. Perkinson 1/

INTRODUCTION

In a large multicultural society such as the United States, it is not surprising that public attention is often focused on achieving equitable distribution of essential goods and services (6). Reasonably equal access to at least primary medical care services is increasingly viewed as a necessity and a right, rather than as a luxury and a privilege. The public debate tends to concentrate on three financial goals regarding medical care: (1) improving access, (2) elimination of financial calamity due to serious health conditions, and (3) cost containment (18).

There is obvious conflict among the foregoing goals. Programs such as Medicare and Medicaid remove some of the financial deterrents to medical care for the elderly and the poor, but they exert upward pressure on medical care costs and prices. Other characteristics of the medical care system, such as near zero-level deductibles and coinsurance rates by health insurance firms, tend to cause price increases (13). In spite of landmark adjustments through Medicare-Medicaid and related crises intervention such as Health Under-Served Rural Areas/Rural Health Initiative programs (17), some groups of Americans still do not have equal access to medical care. In this study, the focus is on access, a concept discussed briefly in the following section.

Access to Medical Resources

Researchers usually follow two main themes regarding the access concept (1). One theme emphasizes access as determined by characteristics of the medical care delivery system and characteristics of the population-at-risk. Useful indicators of this concept include general practitioner/population ratios, hospital bed/population ratios, distribution of physicians by speciality, new types of health care providers, and others. Indicators about characteristics of the population-at-risk and ease of access include: (1) variables not subject to change by policymakers such as age, sex, and race of the population-at-risk, (2) variables subject to change by policymakers such as income, health insurance coverage, and residence, and (3) need, a variable evaluated with varying degrees of accuracy by each potential service user or by professionals in the health care delivery system.

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The second general theme emphasizes access as determined by utilization of health services and consumer satisfaction with such services. Indicators include number of visits to a physician within a given time period, appointment waiting time, waiting room time, and many others.

Examples of Previous Studies

Salber and her associates (16), who did one of the few rural health studies (two communities in North Carolina, one rural, one urban-fringe) reported: The most striking findings were the low utilization of physician and dental services compared with national standards (particularly by the minority population), and the infrequent use of private physicians by Blacks and others.

Grinstead and her associates (7), analyzed data from 4,214 households in the 1973 Arkansas Health Interview Survey. The percentage seeing a physician at least once annually was clearly associated with a higher level of annual household income (7), but, a lower-income individual tended to make more visits per year once a physician was consulted. Seventeen percent of the lower income rural sample respondents reported that they had failed at least once during the reference year to obtain desired assistance from physicians. Only seven percent of their upper-income rural counterparts reported such a situation. Only 37 percent of the respondents in the Grinstead-Schneider study (8) reported at least one visit to the dentist during the reference year compared with the national average of 47 percent. Income was again found to be a major factor affecting usage.

The Davis and Marshall study (4) documented clearly that leading indicators of health revealed that rural Southerners had higher death rates, greater incidence of accidents, more days of disability, and more chronic conditions than did persons in other regions. For example, in 1971 infant mortality rates of 31 to 41 per 1,000 live births for Blacks and others were typical for nonmetropolitan parts of Southern States, compared with 21 overall for the South (13 States), and 19 overall for the United States.

The above studies and earlier national studies have documented that the need for and use of health services tend to vary by age, race, income, and location (5, 10, 12, 15). The relative lack of access by rural or nonmetropolitan residents has been particularly noted.

Purpose of This Study

This study of medical care utilization and access by households in an eight-county area in North Carolina is one of the few done in rural areas of the South. The main objective is to determine which of several factors affect utilization (one proxy for access), with the hypothesis that inequalities will be readily apparent for those who are rural, Black and other, and economically poor. Although this study is based on a sample of households, the data deviate in an important way from other studies using household samples. While most studies sample households, the focus is on individuals within and across households. In contrast, this study focuses on the household as the consumer of medical services. This focus inhibits direct comparisons with other studies but factors associated with health service utilization of individuals should be consistent with household utilization. The advantage in using

household data is that the association of household income with household utilization can be estimated. If income is a constraint in obtaining medical services, the use of such services by individuals within the household must somehow be allocated by the household. The results of this analysis should be particularly useful for consumers and providers in health systems agencies created by the National Health Planning Act, 1975 and those researchers who synthesize the results of smaller studies to provide broader insights useful to policymakers.

The remainder of this report is divided into five sections. The selection of and selected characteristics of the area and the population studied are examined in the first section. In the second section, the supply of and need for health services are considered. Utilization of selected health personnel is considered in the third section. The interactions and relationships between household characteristics and utilization of medical services are examined in the fourth section. The overall results of the study and the implications for health care programs are examined in the final section.

SELECTION OF AND CHARACTERISTICS FOR THE AREA

The dominant policy issue dictating selection of the study area was potential labor adjustment difficulties associated with mechanization of tobacco harvest. The area selected was eight counties in the northeastern Coastal Plains of North Carolina (fig. 1). 2/ The sample was designed to reflect the entire work force of the study area and households of the work force.3/ Therefore, there is little reason to suspect that such a design would bias the household utilization of health services. The original identification of the study area precluded the conformity of the study area with a Comprehensive Health Planning region.4/

The survey upon which this study is based was conducted in the spring of 1975 with completed questionnaires obtained from 2,118 households. Each household was administered the entire questionnaire including the questions about health service utilization.5/

2/ The data used in this report were made available by Dr. Dale M. Hoover, Department of Economics and Business, North Carolina State University, from a survey designed to analyze the adjustments to tobacco harvest mechanization. The survey was made possible with the assistance of a grant from the U.S. Department of Labor, Employment and Training Administration (TPRM Grant No. 21-37-73-25). The counties included in the survey were Beaufort, Bertie, Greene, Hertford, Jones, Lenoir, Martin, and Pitt.

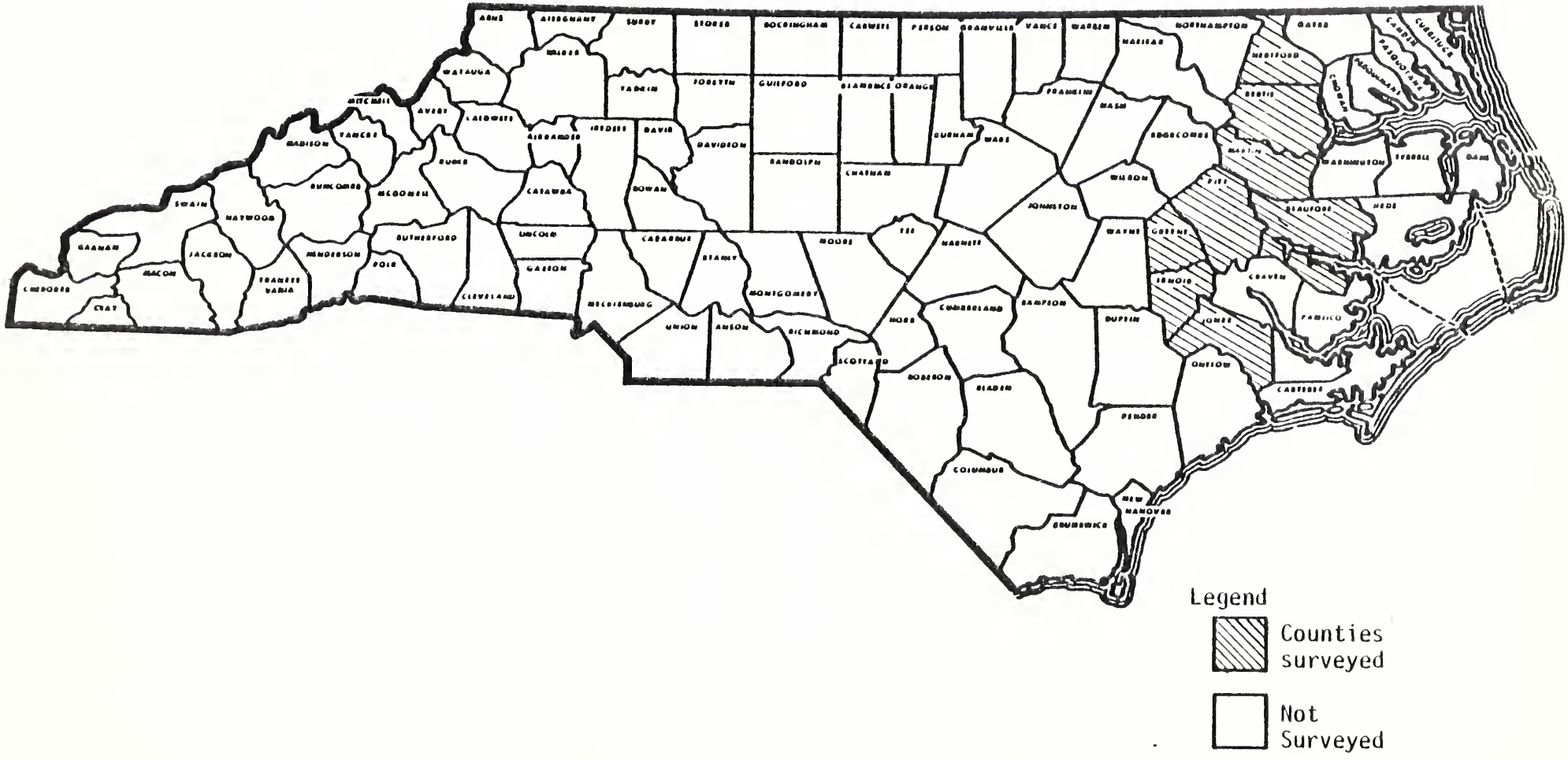
3/ The entire study area was the basic sampling unit with a proportional sample between urban and rural populations and stratified across the area so that different labor markets would be represented. Within each strata, detailed maps of dwelling units were developed with a fixed proportion of units sampled.

4/ Such multicounty areas were provided for by the Comprehensive Health Planning Act of 1967 superceded in 1974 by the National Health Planning and Resources Development Act (P.L. 93-641). The eight counties were all located in the 29-county Health System Area VI.

5/ The pertinent health service questions asked are identified in Appendix A, p. 34.

Figure 1

Location of North Carolina Study Area



The Study Area

The study area had a 1970 population of almost 259,000 in 1970 and about 263,000 in 1974. Two towns in the area had over 10,000 population in 1970: Kinston with a population of about 22,000 and Greenville with a population of about 29,000. Although eight Standard Metropolitan Statistical Areas (SMSA's) were within 150 miles of the study area, no study area county was adjacent to or included in any SMSA. The net out-migration rate from the area during the 1960's was almost 13 percent, but the rate has declined considerably since 1970.

Forty-one percent of the study area population was Black and other in 1970. In 1975, 9.3 percent of the total population was 65 years or older, considerably below the national average of 12.1 percent for nonmetropolitan areas. The age distribution is partly related to a State University located in the study area. The 1974 per capita income in the study area was $4,188 compared with the North Carolina average of $4,616 and the U.S. average of $5,449. The study area can be characterized as predominantly rural, relatively isolated, comparatively low-income, and comprising a large minority population.

Characteristics of Surveyed Households

Of the 2,118 households surveyed, almost 62 percent were White and 38 percent were Black and other (table 1). Ten percent of the White households and 32 percent of the minority households were classified as low-income.6/ (Income is one indicator of the ability to obtain medical services.) The average income (calendar 1974) for high-income minorities was about three times higher than for low-income minorities. The average income of high-income White households was over five times higher than the average for low-income White households. The average number of persons per household was higher for Black and other households than for White households, and lower for low-income households than high-income households (table 1).

A larger percentage of White and high-income households were headed by a male. Over one-third of the Black and other and almost two-thirds of the White low-income households had no one within the household who worked during 1974. The average educational attainment of heads of households was higher for White than for minority households and higher for high-income than for low-income households. About 40 percent of the Black and other low-income households and 47 percent of the White low-income households were headed by a person 65 years old or over. Less than 19 percent of the high-income household heads were 65 or over.

THE SUPPLY OF AND NEED FOR SELECTED MEDICAL SERVICES

The medical resources used by consumers are vast and cover an array of components including personnel ranging from lab technicians to medical doctors; physical facilities such as hospitals, clinics, and medical offices; and assorted diagnostic equipment, medicines, and so forth. All are integral

6/ The low-income classification is discussed in Appendix B., p. 35.

Table 1--Selected household characteristics of respondents, eight-county survey area, by race and income level, 1974.

Item	Unit	Black and other			White			Total/ average
		Income level 1/		Total/ average	Income level 1/		Total/ average	
		Low	High		Low	High		
Households:	No.	261.0	545.0	806.0	132.0	1,180.0	1,312.0	2,118.0
Persons 2/	do.	3.4	3.8	3.7	2.1	3.0	2.9	3.2
Male heads of households	Pct.	46.7	75.8	66.4	51.5	85.7	82.2	76.2
Retired 3/	do.	37.5	3.3	14.4	62.1	11.4	16.5	15.7
Head of household:								
Education 2/	Yrs.	6.5	8.1	7.6	8.1	11.1	10.8	9.6
Age 2/	do.	55.4	49.0	51.1	59.9	47.8	49.0	49.8
Less than 35	Pct.	16.9	21.9	20.2	11.4	26.4	24.9	23.1
35-44	do.	12.6	16.7	15.4	6.8	18.4	17.2	16.5
45-54	do.	14.2	21.7	19.2	12.9	19.7	19.0	19.1
55-64	do.	16.9	21.1	19.7	22.0	17.9	18.3	18.8
65 and over	do.	39.5	18.7	25.4	47.0	17.6	20.6	22.4
Income 2/	Dol.	3,229.0	9,586.0	7,528.0	2,417.0	13,715.0	12,576.0	10,660.0

1/ Defined in Appendix B, p. 35.
2/ Data are averaged.
3/ Households with no one working for wages or salary, or self-employed (including farming) during 1974.

parts of the health care package. This study primarily considers three types of medical personnel, general practitioners, specialists, and dentists. Therefore, the analysis of relative supply of services will also be restricted to these services.

The Supply of Services

There were almost 346,000 physicians in the United States in 1974 with approximately 81 percent involved in patient care (table 2). Almost 80 percent of the North Carolina physicians and 88 percent of the physicians in the study area were directly involved in patient care. One measure of availability (or supply) of a medical service is the population to be served by a unit of service. On the average, there were 759 people per physician in patient care in the United States, compared with 1,015 in North Carolina, and 1,355 in the study area (table 2). Both North Carolina and the study area had higher ratios of population-speciality physicians than that existing for the United States. The population per general practice physician in the study area was moderately higher than the U.S. average, and was considerably below the State average.

Table 2--Total non-Federal physicians, and average population served per physician specialty in the United States, North Carolina, and study area, 1974

Item	Unit	United States	North Carolina	Study area
Total non-Federal physicians:	No.	345,607.0	6,614.0	220.0
Involved in patient care	Pct.	80.6	79.9	88.2
Other professional activities	do.	7.3	8.5	3.2
Not classified	do.	5.9	5.7	6.4
Inactive	do.	6.3	5.9	2.3
Average population served per physician in patient care:				
All physicians	No.	759.0	1,015.0	1,355.0
General practice	do.	4,150.0	5,445.0	4,533.0
Medical specialties	do.	2,884.0	5,417.0	5,975.0
Surgical specialties	do.	2,508.0	3,898.0	4,382.0
Other specialties	do.	3,019.0	8,380.0	10,954.0

Sources: (14, 19, 20).

The supply of dentists was distributed in a pattern similar to physicians, with the study area and North Carolina having larger populations per dentist than the average for the United States (table 3). The population per dentist ratio decreased slightly between 1972 and 1976 for both the State and the study area but on the average increased for the United States.

With the exception of general practitioners, the study area had more people to be served than the average for either the State or the United States. Everything else being equal, this would imply that residents of the study area would have less access to a service unless the medical personnel see more patients for a given unit of time. The intensity of the difficulty with access depends upon the number of people within the area that either prefer to or are willing to locate medical services outside the study area and the number of people coming into the area to obtain medical services.

In general, the ratio of population to medical personnel was greater than the average for the State of North Carolina or the United States. This implied scarcity is of concern only if the state of health of the residents in the area is equal to or worse than the average for the State or for the United States. If, on the average, inhabitants in the study area are in better health than counterparts in the State and the United States, the implied scarcities would be mollified. This possibility is discussed in the following section.

Table 3--Average population served per dentist, United States, North Carolina, and study area, 1976 and 1972

Item	United States	North Carolina	Study area
1976:			
All dentists	1,930	2,678	3,509
Not retired	2,224	2,924	3,756
1972:			
All dentists	1,791	2,887	3,679

Sources: (2, 3).

The Need for Services

The need, or unsatisfied demand, for medical services can be indicated partly by mortality and morbidity data. Infant mortality rates traditionally have been higher for Black and other infants than for White infants, and the infant mortality rate increased as average per capita income decreased (4, 11, 12).

Limitations in activity for health reasons also indicate the need for more health care. Between 1969 and 1971, an average of 12.6 percent of a sample of individuals in North Carolina experienced limited activity due to a chronic health condition (table 4). 7/ This was slightly higher than the average for the United States. 8/ On the average, a respondent in North Carolina experienced almost 16 days of restricted activity and almost seven bed disability days per year in 1969-71 (table 4). Employed persons lost an average of 5.6 days of work due to illness during the period.

Each of these selected indicators of health needs varied according to characteristics of the population. Those age 65 or over had about three times as many restricted activity and bed disability days than did those less than 45 years old (table 4). White individuals experienced fewer restricted activity, bed disability, or work-loss days than individuals of other races (table 4). Low-income individuals had almost twice as many restricted activity and bed disability days and 50 percent more work-loss days than did individuals with higher income (table 4).

The implied health needs therefore varied consistently by age, race, and income level. Because social-demographic characteristics of the North Carolina population varied from the U.S. average, estimates indicated the health needs were slightly higher in North Carolina than in the United States. Yet, the per capita income in the State was higher, and the percentage of Whites was lower than the averages for the study area. These characteristics implied that health needs for the study area would most likely be greater than those for the State.

7/ A chronic condition continues or persists over a long period of time. Examples of a chronic condition would be asthma, stomach ulcer, etc. All illnesses noticed more than three months before the week of the interview or one of 30 listed conditions would be considered chronic (22). Short-term illnesses are not included.

8/ The synthetic estimates in table 4 assume that the only differences in health-related characteristics are variations in social or demographic composition between State and national populations. Therefore, the State figures are derived from the U.S. data. Although the U.S. data are presented in table 4 to allow comparisons among characteristics and to illustrate the slight variations caused by different social-demographic composition of the populations, they will not be discussed. The reader is cautioned not to put much weight on slight variations between the State and the U.S. data.

Table 4--Comparison of individual health need indicators in North Carolina and the United States, by age, race, and income level, 1969-71

Item	Limited activity 1/	Restricted activity 2/	Bed disability 3/	Work loss 4/
North Carolina:	Percent	- - Days per person per year - -		
By age				
Less than 17	5/5.8	10.1	5.0	6/
17-44		12.8	5.5	4.9
45-64	23.1	23.1	9.1	6.7
65 and over	46.4	35.7	15.8	5.8
By race				
White	12.4	15.2	6.4	5.4
Black and other	13.0	17.6	8.4	6.2
By income				
Less than $5,000	22.4	24.0	10.5	7.5
$5,000 or more	9.0	12.9	5.7	4.9
Total	12.6	15.8	6.9	5.6
United States:				
By age				
Less than 17	5/5.3	10.0	4.6	6/
17-44		11.9	4.8	4.6
45-64	19.8	20.3	7.5	6.3
65 and over	42.8	32.7	13.3	5.8
By race				
White	12.0	14.8	5.9	5.0
Black and other	11.4	16.5	7.3	7.0
By income				
Less than $5,000	23.4	24.4	9.9	7.2
$5,000 or more	8.5	12.2	5.0	4.8
Total	11.9	15.0	6.1	5.2

1/ Usual activities of the individual limited by health condition.
2/ Usual activity restricted for the entire day.
3/ Confined to a bed for all or most of the day.
4/ Did not work for at least one-half of the normal work day.
5/ Limited activity not computed separately by source for those less than 17 and those 17-44.
6/ Work-loss not estimated by source.
Source: (22).

The characteristics of the surveyed households discussed previously hold additional implications for the potential health needs of households in the study area. For example, differences in the utilization of medical services by households may reflect the differences in the number of persons within the household. Black and other households averaged more persons per household than White households, and high-income households had more persons per household than low-income households. Despite low-income households averaging fewer persons, the medical needs for such households may be relatively high since a disproportionate share had a household head 65 years old or over.

In general, there were more people to be served per unit of medical service in the study area than for either the State or the Nation. Health needs seem to be higher for the study area than either the State or the United States. The restricted supply of services and the potential for relatively high demand suggest that it may be difficult to obtain medical assistance in the study area.

THE UTILIZATION OF MEDICAL PERSONNEL

In this study, the use of three types of medical personnel (general practitioners, medical specialists, and dentists) are examined. About 70 percent of all individuals in the United States and North Carolina visited a physician each year during 1969-71 (table 5). As expected, a greater percentage of persons age 65 and over visited a physician and averaged more visits per person than did those under 65. 9/ Despite the lower expected needs identified for Whites and higher income individuals, the percentage of persons in these two groups visiting a physician was higher than for their counterparts. The utilization of types of physicians by households in the study area is discussed below.

General Practitioners

Of the 2,118 households surveyed, almost 90 percent utilized the services of general practitioners (GPs) at least once during 1974 (table 6).

The utilization of GP services was not equally distributed. A larger proportion of White and high-income households utilized the services of a GP during 1974 (table 6). Based on the probable health limitations of individuals discussed previously, the need for medical attention would tend to be just the opposite, with high income persons and Whites having lower needs.

As health service needs do not occur uniformly over time, the year a GP was last consulted was obtained for those who did not visit one in 1974.

9/ The relatively high percentage of persons 17-44 visiting a physician may be related to a greater percentage of women than men using the services of a physician partly because women 17-44 are in their prime child-bearing years, a time period of heavy physician use.

Table 5--Average annual utilization of physician services in North Carolina and the United States, by age, race, and income, 1969-71

Item	North Carolina		United States	
	Average yearly physician visits per person	Persons with one or more visits per year	Average yearly physician visits per person	Persons with one or more visits per year
	Number	Percent	Number	Percent
By age:				
Less than 17	3.6	67.9	3.9	69.8
17-44	4.5	72.4	4.5	73.0
45-64	5.0	68.4	5.1	69.4
65 and over	6.1	71.9	6.4	73.2
By race:				
White	4.6	71.9	4.7	72.2
Black and other	3.8	64.0	3.9	64.5
By income:				
Less than $5,000	4.6	66.9	5.0	68.2
$5,000 or more	4.5	72.8	4.5	72.2
Total	4.4	70.0	4.6	71.2

Source: (22).

About 37 percent of those households who did not see a GP in 1974 utilized the services of one in either 1973 or the first few months of 1975 (table 6). A smaller percentage of White than Black or other households did not see a GP in 1974, but 42 percent of these White households saw a GP in either 1973 or 1975, compared with 31 percent of Black or other households (table 6). For all races, a greater proportion of high-income households used the services of a GP in either 1973 or 1975 than did low-income households. Therefore, these differences in utilization were even larger for the extended period than for the single year of 1974.

Table 6--Utilization of general practice medical personnel, by race and income level, study area.

Item	Unit	Black and other			White			All households
		Income level 1/		Total/ average	Income level 1/		Total/ average	
		Low	High		Low	High		
Survey households	No.	261.0	545.0	806.0	132.0	1,180.0	1,312.0	2,118.0
Service used in 1974:								
Yes	Pct.	85.4	87.7	87.0	84.1	91.9	91.1	89.5
No	do.	10.7	9.0	9.6	12.9	6.2	6.9	7.9
Don't know	do.	2.3	1.8	2.0	3.1	1.0	1.2	1.5
Never use	do.	1.5	1.5	1.5	0.0	.9	.8	1.1
Year last used 2/								
1975 3/	do.	0.0	4.1	2.6	0.0	4.1	3.3	3.0
1973	do.	28.6	28.6	28.6	23.5	42.5	38.9	34.1
1970-72	do.	28.6	22.4	24.7	41.2	24.7	27.8	26.3
Before 1970	do.	21.4	20.4	20.8	11.8	12.3	12.2	16.2
Don't know	do.	21.4	24.5	23.4	23.5	16.4	17.8	20.4

1/ Defined in Appendix B, p. 35.
2/ For those reporting service not used in 1974.
3/ Only part of the year since the survey was completed in the spring of 1975.

Frequency of utilization--Of the 1,896 households using the services of a GP in 1974, 91 percent saw a GP located within the study area (table 7). Black and other households tended to use locally provided services more than White households. Sample households consulted a GP an average of nine times in 1974 with those going outside the area utilizing such services more frequently than those staying within the study area. Although fewer low-income households utilized the services of a GP, those obtaining such services averaged more visits than high-income households, a result consistent with analyses of individuals (7).

The utilization of health services by individuals generally increases with age. The expected rate of household utilization is not as clear, since the composition of the household varies both in numbers and in age distribution over the life cycle. In general, however, one would expect younger heads of households to have the lowest utilization because health service needs generally increase with age and because young household families are probably smaller. The spouses in such households would be in the prime child-bearing years however. Households with the older heads probably have fewer members than the average, but such households would tend to have more health service needs.

The average number of visits to a GP were lowest for those households under age 35, as expected, except for White low-income households (table 7). The average number of visits for households with heads 65 or over was relatively low except for White high-income households. For households with heads between age 35 and 65, Black and other households had slightly more GP visits on the average than White households, and low-income Black and other households had more visits than their high-income counterparts.

About 45 percent of the households surveyed visited a GP fewer than five times in 1974 (table 7). Seven percent visited a GP 25 or more times -- more than twice a month on the average.

Proximity to service--One measure of access to medical services is the physical proximity to the service. Most households were moderately close to the services of GP's utilized since households traveled nine miles one way on the average (table 8). For the 91 percent of the households who received GP services locally, the average one-way distance was about seven miles.10/ Those utilizing the service of GP outside the study area averaged 27 miles one-way, with low-income households traveling almost 15 miles further than high-income households.

If visits to GP's are distributed proportionately among physicians with each physician seeing approximately the same number of patients, a distribution of visits by city size would indicate the relative distribution of GP's by city size. For households utilizing the services of local physicians, about 20 percent of the households went to a city of over 25,000 population, and another 21 percent went to a city between 10,000 and 25,000 (table 8).

10/ The percentage classified as local differed slightly between the analyses of utilization and distance traveled for GP services because analysis of distance did not require health service utilization during 1974.

Table 7--Household visits to obtain the services of general practitioners, by race and income level, study area, 1974.

Visits	Unit	Black and other			White			All households
		Income level 1/		Total/ average	Income level 1/		Total/ average	
		Low	High		Low	High		
Households 2/	No.	223.0	478.0	701.0	111.0	1,084.0	1,195.0	1,896.0
Local service 3/	Pct.	95.1	93.1	93.7	86.5	89.7	89.4	91.0
Average visits								
Local 3/	No.	10.2	8.6	9.1	9.0	8.6	8.7	8.8
Outside 4/	do.	6.0	6.7	6.5	10.5	11.8	11.6	10.3
Total	do.	10.0	8.4	8.9	9.2	9.0	9.0	9.0
Visits by age of household head								
Less than 35	do.	6.8	6.0	6.2	10.1	7.4	7.5	7.1
35-44	do.	13.6	9.0	10.2	5.7	10.2	10.0	10.1
45-54	do.	13.7	8.6	9.7	7.6	8.8	8.7	9.1
55-64	do.	12.9	10.2	10.9	11.0	8.9	9.1	9.8
65 and over	do.	7.8	8.6	8.2	9.2	10.3	10.0	9.3
Frequency of visits								
1	Pct.	13.9	9.2	10.7	17.1	11.4	12.0	11.5
2-4	do.	27.8	36.2	33.5	32.4	33.1	33.1	33.2
5-9	do.	22.0	23.6	23.1	16.2	22.0	21.4	22.0
10-24	do.	27.8	25.1	26.0	27.0	25.9	26.0	26.0
25 or more	do.	8.5	5.9	6.7	7.2	7.6	7.5	7.2
Total 5/	do.	100.0	100.0	100.0	100.0	100.0	100.0	100.0

1/ Defined in Appendix B, p. 35.
2/ Households reporting service obtained in 1974.
3/ Service obtained within the study area.
4/ Service obtained outside the study area.

Table 8--Mileage to and size of place where services of general practitioners were usually obtained, by race and income level, study area.

Item	Unit	Black and other			White			All households
		Income level 1/		Total/ average	Income level 1/		Total/ average	
		Low	High		Low	High		
Households 2/	No.	256.0	535.0	791.0	131.0	1,164.0	1,295.0	2,086.0
Local service 3/	Pct.	94.9	92.9	93.6	87.8	89.4	89.3	90.0
Average one-way mileage								
Local 3/	Miles	6.5	7.5	7.1	7.5	7.1	7.2	7.2
Outside 4/	do.	46.1	22.5	28.5	40.5	25.3	27.1	27.4
Total	do.	8.5	8.5	8.5	11.5	9.0	9.3	9.0
Local service obtained in place of:								
25,000 or more	Pct.	19.3	17.7	18.2	12.2	21.1	20.2	19.5
10,000-24,999	do.	13.2	16.1	15.1	26.1	24.9	25.0	21.2
5,000-9,999	do.	19.7	28.0	25.2	32.1	25.2	25.9	25.6
2,500-4,999	do.	16.0	15.7	15.8	12.2	10.3	10.5	12.6
Less than 2,500	do.	31.7	22.5	25.5	17.4	18.5	18.4	21.2

1/ Defined in Appendix B, p. 35.
2/ Households reporting place where service was obtained.
3/ Destination located within the study area.
4/ Service obtained outside the study area.

Another 21 percent of the households utilized a GP located in a town with less than 2,500 population.

Forty-five percent of the White and 33 percent of the Black and other households visited a GP in a town containing 10,000 or more people. A greater proportion of Black and other households, especially low-income households, consulted a GP located in a town of less than 2,500 population.

In general, the pattern of household utilization of GP services was similar to the utilization of physician services nationally. A greater proportion of White and high-income households utilized a GP than did Black and other or low-income households, despite the latter's probable larger health needs. Low-income households averaged more visits than did high-income households (in contrast to national utilization but consistent with the Arkansas study). About 90 percent of the survey households used the services of a GP located within the study area.

Medical Specialists

About 53 percent of the households in the study indicated they had utilized the services of a medical specialist (MS) at least once during 1974 (table 9). Twenty-three percent indicated they had not used MS services during 1974, and another 23 percent reported they had never utilized the services of a specialist. The utilization of MS services followed a pattern similar to the use of GP services. A higher percentage of White and high-income households saw a MS than did either Black and other or low-income households. These results were consistent with the national utilization of all physicians services (table 5), but the opposite from what would be implied by the differences in expected need (table 4). Of those who did not see a specialist in 1974, 34 percent of White and 26 percent of Black and other households utilized the services of a MS in either 1973 or 1975 (table 9). The variations in utilization between races were therefore even more exaggerated for the period after 1972 than just for 1974.

Frequency of utilization--Seventy-seven percent of the survey households visited a MS within the study area in 1974 (table 10). The percentage of households obtaining local MS services was considerably lower than for local GP services reflecting, perhaps, the differences in supply of medical specialists in the area. Also, in contrast with GP services, a slightly greater proportion of White and low-income households obtained medical specialists' services locally than did Black and other or high-income households.

The services of a MS were obtained an average of almost five times during 1974 with White households utilizing specialists' services more frequently than Black and other households. Low-income households averaged fewer visits to a specialist than high-income households in contrast to GP utilization.

Despite older individuals having greater expected needs for services, this need was not reflected by the average number of household visits. Households with a head under 45 years old averaged about two visits per year

Table 9--Utilization of medical specialist personnel, by race and income level, study area.

Item	Unit	Black and other			White			All households
		Income level 1/		Total/ average	Income level 1/		Total/ average	
		Low	High		Low	High		
Households	No.	261.0	545.0	806.0	132.0	1,180.0	1,312.0	2,118.0
Service used in 1974:								
Yes	Pct.	38.3	40.4	39.7	43.2	62.4	60.5	52.6
No	do.	27.6	22.4	24.1	28.8	22.4	23.0	23.4
Don't know	do.	1.1	1.3	1.2	.8	1.1	1.1	1.1
Never use	do.	33.0	36.0	35.0	27.3	14.1	15.4	22.9
Year last used 2/								
1975 3/	do.	4.2	4.1	4.1	4/	6.4	5.6	5.0
1973	do.	25.0	20.5	22.2	31.6	28.4	28.8	26.2
1970-72	do.	12.5	26.2	21.1	23.7	30.3	29.5	26.2
Before 1970	do.	11.1	8.2	9.3	15.8	16.7	16.6	13.7
Don't know	do.	47.2	41.0	43.3	28.9	18.2	19.5	28.8

1/ Defined in Appendix B, p. 35.
2/ For those reporting service not used in 1974.
3/ Only part of the year since the survey was completed in the spring of 1975.
4/ No respondents.

Table 10--Household visits to obtain the services of medical specialists, by race and income level, study area, 1974.

Visits	Unit	Black and other			White			All households
		Income level 1/		Total/ average	Income level 1/		Total/ average	
		Low	High		Low	High		
Households 2/	No.	100.0	220.0	320.0	57.0	737.0	794.0	1,114.0
Local service 3/	Pct.	78.0	75.5	76.2	80.7	77.6	77.8	77.4
Average visits								
Local 3/	No.	4.0	4.0	4.0	3.7	5.2	5.1	4.8
Outside 4/	do.	3.4	3.9	3.7	5.8	6.3	6.2	5.5
Total	do.	3.8	4.0	3.9	4.1	5.4	5.3	4.9
Visits by age of household head								
Less than 35	do.	4.2	6.0	5.5	5.0	5.9	5.9	5.8
35-44	do.	3.5	4.5	4.2	7.7	6.8	6.8	6.2
45-54	do.	4.5	3.8	3.9	5.1	4.1	4.2	4.1
55-64	do.	5.4	2.9	3.8	2.1	4.7	4.4	4.2
65 or over	do.	2.3	2.7	2.5	3.6	5.2	4.9	4.2
Frequency of visits								
1	Pct.	36.0	3.14	32.8	33.3	29.6	29.8	30.7
2-4	do.	42.0	44.5	43.8	33.3	37.4	37.2	39.0
5-9	do.	12.0	15.5	14.4	19.3	15.7	16.0	15.5
10-24	do.	9.0	7.7	8.1	14.0	14.9	14.9	12.9
25 or more	do.	1.0	.9	.9	0.0	2.3	2.1	1.8
Total 5/	do.	100.0	100.0	100.0	100.0	100.0	100.0	100.0

1/ Defined in Appendix B, p. 35.
2/ Households reporting service obtained in 1974.
3/ Service obtained within the study area.
4/ Service obtained outside the study area.
5/ Detail may not equal due to rounding.

more than households headed by persons 45 years old or over (table 10). This difference was more apparent for White than for Black and other households. Younger households would be more likely to use specialties such as pediatrics obstetrics and gynecology which may explain the relatively high average visits. In general, the older households were not heavy users of either GP's or MS's.

Proximity to service--The average household traveled over 12 miles one-way to see a medical specialist within the study area, and almost 56 miles to see a specialist outside the area (table 11). The average distance traveled by all households to a MS was more than twice the distance associated with obtaining GP services. The difference in distance traveled may be partially explained by either the ratio of survey area population per specialist or by specialists locating in different parts of the study area.

About 73 percent of those obtaining local MS services compared with 41 percent of those obtaining GP services traveled to a place with 10,000 or more population. A greater proportion of high-income and White households obtained the services of specialists in the two largest places in the study area than did either low-income or Black and other households. The distribution of use by size of place shows the tendency for medical specialists to concentrate in larger communities.

Dental Services

Nationally, about 46 percent of all individuals utilized the services of a dentist, averaging 1.5 visits per year (table 12). The use of dental services increased to age 44, and then decreased to an average of only 25 percent for persons 65 or over. A larger percentage of Whites and individuals with annual incomes of $5,000 or more used dental services more often than did individuals of other races or with incomes of less than $5,000. Estimates of the percentage in North Carolina using dental services and the frequency of visits were lower than the comparable U.S. figures in every case (table 12). The pattern of dental service utilization of individuals was therefore similar to the use of physician services discussed previously.

About 63 percent of the households in the study area utilized the services of a dentist during 1974, with a greater percentage of high-income and White households using such services than did their counterparts (table 13). For those households who did not see a dentist during 1974, a larger proportion of White and high-income households saw a dentist in either 1973 or 1975 than did Black and other or low-income households. As was true for GP's and medical specialists, the variation in household utilization by income or race categories became larger when the 1973-75 period was examined rather than just the year 1974.

Frequency of utilization--Ninety percent of the households used dental services within the study area (table 14). White households averaged 4.8 visits compared with 2.9 visits for Black and other households. High-income White households averaged more visits than low-income White households, but income level had little effect on the utilization of dental services by Black and other households. Household utilization of dental services varied by age of head of household, with the peak visits by households with heads 35-44 years old. Only low-income households deviated from this pattern.

Table 11--Mileage to and size of place where services of medical specialists were obtained, by race and income level, study area.

Item	Unit	Black and other			White			All households
		Income level 1/		Total/ average	Income level 1/		Total/ average	
		Low	High		Low	High		
Households 2/	No.	173.0	347.0	520.0	95.0	1,006.0	1,101.0	1,621.0
Local service	Pct.	83.2	77.8	79.6	76.8	77.8	77.7	78.3
Average one-way mileage								
Local 3/	Miles	10.9	12.3	11.8	12.3	13.0	12.9	12.5
Outside 4/	do.	56.4	57.6	57.3	63.9	54.3	55.2	55.8
Total	do.	18.5	22.0	20.8	24.3	22.1	22.3	21.8
Local service obtained in places of								
25,000 or more	Pct.	39.6	40.0	39.9	30.1	46.7	45.3	43.5
10,000-24,999	do.	22.2	27.8	25.8	31.5	30.9	31.0	29.3
5,000-9,999	do.	25.0	21.5	22.7	30.1	20.6	21.4	21.8
2,500-4,999	do.	4.2	4.4	4.3	4.1	.8	1.1	2.1
Less than 2,500	do.	9.0	6.3	7.2	4.1	1.0	1.3	3.2

1/ Defined in Appendix B, p. 35.
2/ Households reporting place where service was obtained.
3/ Destination located within the study area.
4/ Service obtained outside the study area.

Table 12--Utilization of dental services by individuals in North Carolina and the United States, 1969-71.

	North Carolina		United States	
	Dental visits per person	Percent of persons with a visit	Dental visits per person	Percent of persons with a visit
	Annual average			
Total	1.1	40.3	1.5	46.3
By age				
Less than 17	1.0	39.4	1.4	46.6
17-44	1.3	46.8	1.7	52.8
45-64	1.1	37.1	1.6	43.9
65 or over	0.7	21.3	1.1	25.1
By race				
White	1.3	44.6	1.6	48.7
Other	0.6	26.4	0.8	29.4
By income				
Less than $5,000	0.7	27.4	0.9	29.9
$5,000 or more	1.3	46.2	1.7	51.1

Source: (22).

Proximity to service--On the average, households traveled about 10 miles one-way to obtain dental services. This was farther than the distance traveled to obtain the services of a GP but not as far as travel for a MS (table 15). The distribution of households by size of place where dental services were obtained indicated that 43 percent traveled to a place of 10,000 or more population, a proportion similar to that associated with services of GP's. Although dental services were somewhat concentrated in places of 5,000-9,999, the overall distribution of GP's and dentists would seem to be approximately the same so long as the distribution of household utilization is indicative of physical location. As with the use of other medical personnel, a larger percentage of White and high-income households obtained their dental services in places of 10,000 or more population.

INTERRELATIONSHIPS ASSOCIATED WITH UTILIZATION

In the preceding sections, the variations in household utilization of selected medical services by race, income level, and age of the head of household were examined. The interactions among these and other variables possibly

Table 13--Utilization of dentists, by race and income level, study area.

Item	Unit	Black and other			White			All households
		Income level 1/		Total/ average	Income level 1/		Total/ average	
		Low	High		Low	High		
Households	No.	261.0	545.0	806.0	132.0	1,180.0	1,312.0	2,118.0
Service used in 1974:								
Yes	Pct.	46.7	49.9	48.9	46.2	75.0	72.1	63.3
No	do.	37.9	35.4	36.2	43.9	19.2	21.6	27.2
Don't know	do.	.4	1.7	1.2	.8	.8	.8	1.0
Never use	do.	14.9	13.0	13.6	9.1	5.0	5.4	8.5
Year last used 2/								
1975 3/	do.	6.1	1.0	2.7	1.7	3.5	3.2	3.0
1973	do.	19.2	29.0	25.7	20.7	30.1	28.2	26.9
1970-72	do.	20.2	32.1	28.1	32.8	32.3	32.4	30.2
Before 1970	do.	28.3	20.2	23.0	31.0	23.4	25.0	24.0
Don't know	do.	26.3	18.6	21.2	13.8	10.6	11.3	16.3

1/ Defined in Appendix B, p. 35.
2/ For those reporting service not used in 1974.
3/ Only part of the year since survey was completed in the spring of 1975.

Table 14--Household visits to obtain the services of dentists, by race and income level, study area, 1974.

Visits	Unit	Black and other			White			All households
		Income level 1/		Total/ average	Income level 1/		Total/ average	
		Low	High		Low	High		
Households 2/	No.	122.0	272.0	394.0	61.0	885.0	946.0	1,340.0
Local service 3/	Pct.	91.8	90.4	90.9	82.0	89.7	89.2	89.7
Average visits								
Local 3/	No.	2.7	3.0	2.9	3.2	4.9	4.8	4.2
Outside 4/	do.	3.7	2.8	3.0	3.6	4.9	4.7	4.3
Total	do.	2.8	3.0	2.9	3.3	4.9	4.8	4.2
Visits by age of household head								
Less than 35	do.	2.6	3.1	2.9	3.1	4.9	3.8	4.3
35-44	do.	2.3	3.5	3.1	2.6	7.1	6.9	5.9
45-54	do.	1.9	3.1	2.9	5.2	4.7	4.7	4.2
55-64	do.	4.0	2.7	3.0	4.6	3.6	3.7	3.5
65 or over	do.	3.0	2.3	2.6	2.1	3.0	2.8	2.8
Frequency of visits								
1	Pct.	44.3	33.5	36.8	36.1	20.1	21.1	25.7
2-4	do.	45.1	50.4	48.7	37.7	44.3	43.9	45.3
5-9	do.	7.4	11.0	9.9	21.3	22.3	22.2	18.6
10-24	do.	2.5	5.1	4.3	4.9	12.5	12.1	9.8
25 or more	do.	.8	0.0	.3	0.0	.8	.7	.6
Total 5/	do.	100.0	100.0	100.0	100.0	100.0	100.0	100.0

1/ Defined in Appendix B, p. 35.
2/ Households reporting service obtained in 1974.
3/ Service obtained within the study area.
4/ Service obtained outside the study area.
5/ Detail may not equal total due to rounding.

Table 15--Mileage to and size of place where services of dentists were obtained, by race and income level, study area.

Item	Unit	Black and other			White			All households
		Income level 1/		Total/ average	Income level 1/		Total/ average	
		Low	High		Low	High		
Households 2/	No.	219.0	468.0	687.0	118.0	1,109.0	1,227.0	1,914.0
Local service 3/	Pct.	93.2	88.9	90.2	84.7	88.8	88.4	89.1
Average one-way mileage								
Local 3/	Miles	7.3	7.6	7.5	6.7	8.1	8.0	7.8
Outside 4/	do.	22.5	19.7	20.3	42.9	37.2	37.8	32.2
Total	do.	8.3	8.9	8.7	11.7	11.3	11.3	10.4
Local service obtained in places of:								
25,000 or more	Pct.	19.1	15.9	16.9	9.0	22.3	21.1	19.6
10,000-24,999	do.	15.2	19.2	17.9	28.0	26.4	26.5	23.4
5,000-9,999	do.	23.0	32.5	29.4	35.0	28.3	28.9	29.1
2,500-4,999	do.	14.7	13.9	14.2	16.0	13.1	13.4	13.7
Less than 2,500	do.	27.9	18.5	21.6	12.0	9.8	10.0	14.3

1/ Defined in Appendix B, p. 35.
2/ Households reporting place where service was obtained.
3/ Destination located within the study area.
4/ Service obtained outside the study area.

influencing utilization of medical services were not taken into account. This section examines the interaction among selected household characteristice expected to affect household utilization of medical services.

Expected Relationships

Based on national utilization and the analyses from the previous sections, one would expect White households to have a higher level of utilization than Black and other households despite lower expected needs. Utilization would also be expected to be affected by the age of the household head. As need for medical services is expected to increase with age, a variable of the head of household's age squared was also used. Therefore, utilization could increase with age with a positive sign on "age squared" indicating that utilization increasing at an increasing rate, and a negative sign indicating that utilization would be increasing at a decreasing rate. Need for medical services was also expected to be greater for individuals from households with less than $5,000 income, but household utilization was found to be greater for high-income households. Over the range of household income, it would be expected that utilization would vary directly with income.

The observed household utilization of medical personnel could be affected by the number of persons residing within the household. In addition, the number of children could also affect utilization since their health needs may require a different form of service than adults. Therefore, one would expect household utilization to increase with both the number of persons and the number of children in the household since the population at risk would be higher for large households than small households.

The sex of the head of the household could be related to household utilization for two reasons. First, females tend to have a greater need for services (22). Female-headed households, therefore, may have higher utilization. Second, female-headed households tend to have lower income than male households which could affect utilization from the income side. As the effect of income will be handled explicitly in the model, female-headed households would be expected to have greater utilization than male-headed households.

The educational attainment of the head of household would also be directly related to household utilization of medical services. One would expect the awareness of health care and preventive practices to increase with educational level resulting in more medical service utilization. At the same time, such awareness may actually reduce the need for utilization over the long run since the causitive factors for an illness may be diagnosed and treated earlier. For this analysis, it was hypothesized that educational level is associated with greater household utilization.

The entire study area could be characterized as being a nonmetropolitan area. But within this nonmetropolitan area, people live in both rural and urban areas. 11/ The objective of including a variable on "rural residence"

11/ Places of 2,500 or more population are classified as urban. Places with less than 2,500 are classified as rural.

is to determine if there is a significant difference in medical service utilization between residents of a rural and an urban area.

The Analysis

An ordinary least squares regression model was used to examine the interrelationships among these specified characteristics. To examine utilization, the number of visits to a medical service was used as the dependent variable. This analysis deviates from the preceding section in that those specifying a service was not used in 1974 were included in the model with a value of zero visits. 12/

The results of a regression model can be used to indicate two things. First, the coefficient of multiple determination (R^2) indicates the percentage of the variation in the dependent variable (visits) explained by the independent variables. Low explanatory powers indicates that the variation in visits is not well explained by the variables included in the model. Second, the value and significance of the coefficients for individual independent variation indicates the relationship of that variable with the number of medical service visits when all other specified variables are held constant at their mean value.

The nine variables selected for examining household utilization of medical services explained a relatively small proportion of the variance in visits: 14 percent for dentists and less than four percent for GP's and medical specialists (table 16). Therefore, variables other than those specified in the model, or refinements of the specified variables, account for most of the variation in household utilization.

The coefficients for individual variables indicate the interrelationships between factors among the different services. With all characteristics except race held constant at their respective means (that is, for a given size household, equal age and educational level of head, the same level of income, and so forth) White households would have from 1.5 to 1.8 more visits to a medical service than a minority household with the same characteristics (table 16). These differences were statistically significant from zero at the one percent level. 13/ Race was the only factor significant for all three medical personnel services.

Once the other characteristics of a household were taken into consideration, an increase by one in the number of persons per household increased, as expected, the number of household visits to a GP by 0.9. In contrast to expectations, an increase in the educational level of the head of household

12/ Households using a service in 1974 but not knowing how often the service was used, and households not knowing if a service was used, were excluded from the analysis.

13/ At this significance level, there would be only one chance in 100 that the variation would be as large from chance.

Table 16--Regression analysis of household visits to selected medical services in 1974, study area.

	General practice	Medical specialist	Dentist
Intercept	2.647	4.530**	-2.001**
Race 1/	1.817***	1.529***	1.451***
Persons 2/	.928***	.219	.502***
Male head 3/	- .172	- .193	.187
Head's age	.117	- .069	.058
Head's age squared	- .001	.004	- .001**
Head's education	- .231***	- .042	.125***
Children 4/	- .173	.178	- .232*
Total income 5/	- .001	.004*	.005***
Rural residence 6/	.780	- .219	- .096
R^2	.038	.027	.139
Observations	2012	1569	1875

*** = Significant at 1 percent level.
** = Significant at 5 percent level.
* = Significant at 10 percent level.
1/ White = 1, Black or other = 0.
2/ Persons per household.
3/ Male head = 1, female head = 0.
4/ Children less than 12 years old.
5/ Household income in $100 units.
6/ Household located in rural area = 1, not in rural area = 0.

was associated with a decrease in the number of household GP visits. Perhaps this reflects preventive health practices and early treatment. None of the other characteristics were statistically different from zero.

For household visits to a medical specialist, the only variable besides race significantly different from zero was total income. As income increased, visits to a specialist increased. Despite the statistical significance, a substantial increase in income would be required to affect household visits in a meaningful manner. A $1,000 increase in income would be associated with .04 additional household visits to a specialist.

Factors associated with the utilization of dental services were similar to utilization of GP services, but the direction of the relationship was not always consistent. The utilization of both GP's and dental services were significantly and directly associated with race and the number of persons in the household. The number of children in the household was inversely related to dental visits perhaps indicating the necessity for allocating scarce household resources. In contrast to the use of GP's services, dental service utilization increased with the educational level of the household head, possibly reflecting awareness of preventive dental care. Although utilization of dental services increased with income, a large change in income would be required to increase the number of household visits.

Alternative models were also considered since the model selected explained only a small part of the variation in utilization of medical services. Two variations were attempted. First, only those households reporting the use of medical service during 1974 were analyzed. The relationships found were generally consistent with those identified in table 16, and the variation in service utilization explained was no greater than when all households were examined.

Second, as the services provided by GP's and medical specialists are complementary to each other, and in some cases the services of one can be a substitute for the services of the other, the visits to a GP and an MS were added together for analysis. Although the values of the coefficients changed, the results were identical with those for GP's.

The regression models did little to explain the variation in the use of medical services, perhaps because such services are obtained as necessary. The models did indicate that patterns of health service utilization based on averages for one or two characteristics may not be adequate. For example, average use tended to vary by level of income. When income was examined simultaneously with other household characteristics, it was found to be significantly associated with two of the three services, but a substantial change in income would be required to produce small changes in the number of visits.

Race, however, was definitely a factor associated with utilization. As the needs of Black and other households would seem to be higher than that for White households, the identification of why minority households have lower utilization would be important, especially since income does not seem to be a factor.

CONCLUSIONS

Of the 2,118 households studied, 90 percent utilized the services of a GP, 53 percent used the services of a medical specialist, and 63 percent used the services of a dentist at least once during 1974. The number of visits per household averaged nine for GP's, five for MS's, and four for dentists. Local service was used by 91, 77, and 90 percent of the study households, respectively. The differences in utilization of local service was consistent with the distribution of practitioners as measured by the population-practitioner ratio.

The utilization of medical personnel did not follow the expected need for medical services but did follow national patterns of utilization. A greater percentage of White and high-income households utilized medical personnel than did Black and other and low-income households. With the exception of GP utilization, White or high-income households also averaged more visits. For GP's, there was little difference in the average annual visits by race, but low-income households averaged more visits than did high-income households.

On the average, household members traveled nine miles one-way to see a GP, 10 miles to see a dentist, and 22 miles to see a medical specialist. Households utilizing services outside the study area traveled about four times farther than did households utilizing local services. The distribution of medical personnel by size of place was similar between GP's and dentists, assuming the place where households obtain services is associated with the relative distribution of medical personnel, with about 44 percent of the household obtaining local services in a place with more than 10,000 population.

Despite the expected need for medical services increasing with age of individuals, households headed by persons 65 years of age or over averaged fewer visits than did households with heads less than 45 years old. Whether this difference in visits was related to variations in the number of persons within the household or ability to obtain services (transportation, low-income, etc.) could not be evaluated from the average data presented.

Multiple regression was used to account for the interactions between the utilization of medical service personnel and household characteristics such as race, number of persons and young children in the household, the age and educational level of the head of household, household income, and residence. When these characteristics were considered and held constant at their respective average values, an increase in the number of persons per household was associated with an increase in the utilization of services.

The effect of household income on utilization was significantly different from zero and directly related to income for two services, but a large change in income would be required to produce a small change in utilization once other household characteristics were taken into consideration. The income level of the household may be relatively unimportant because of two factors.

First, income transfer programs such as Medicare and Medicaid assist the payment for medical services obtained and should therefore reduce the income barrier to obtaining medical services for low-income households. Second, the importance of income may be low because households seek and obtain medical services when the need is felt to be critical regardless of income level.

Educational attainment is frequently considered to be associated with awareness of health needs, availability of health services, and the attributes of preventive care. With the other household characteristics held constant, an increase in the educational attainment of the head of household reduced the utilization of GP services and increased the utilization of dental services. Both relationships were consistent with preventive care as fewer visits to a GP may be required on the average if an illness is diagnosed and treated early. In the same manner, increased utilization of dental services as educational level increased may also be indicative of the awareness of preventive dental care.

The household characteristic with the most influence on medical service utilization was race. White households utilized medical services more frequently than Black and other households, everything else being equal. This result was obtained for all households in the study, and for only those households who actually obtained services during 1974. The indicators of health service needs discussed indicated that Blacks and others averaged greater incidences of illness-related restricted activity. When this is combined with the results of this study and the studies cited earlier that minorities have lower utilization rates, the dominant question becomes why do Black and other households have lower utilization of medical services than White households? Perhaps race is important only because race is a proxy for a set of characteristics that have either not been adequately measured or included in the analysis. Or perhaps as indicated by Aday and Anderson (1), in examining the factors influencing utilization, "One must also consider the potential consumer's willingness to seek care. This characteristic depends on his health attitudes, knowledge about health care and the social and cultural definitions of illness he has learned." It may be possible to add to this list the social and cultural difficulties in obtaining care learned in an earlier time.

This study of utilization highlights those households in the study area that actually obtained health services. Households reporting that services had not been utilized during 1974 either had no one needing a service or the household did not seek or could not obtain medical services even if a need for service was indicated. Information beyond the scope of this study would be required to determine whether under-utilization of medical services by Black and other households exists. With the income and household characteristics examined in this study, only a small percentage of the variability in medical service utilization was accounted for. A more complete analysis might examine whether a need for medical services was felt and the reasons why medical services were or were not utilized. Even in a relatively homogeneous area such as the area studies here, there may be social and cultural malaise in obtaining medical services. If this is true, then knowing that there were differences in obtaining medical services by race is not enough upon which to base policy prescriptions. The underlying precepts governing utilization of medical service must first be recognized, even if not completely understood, before cost-effective policy systems can be created.

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APPENDIX A

Questions From Survey Related To Utilization Of Medical Service Personnel

Where do you or other members of this household usually travel, if and when you do the following:	Name of Town	Name of County	One-Way Distance (in miles)	How often did you go in 1974? 0 = None	If none in IV: When was the last time you went?
	I	II	III	IV	V
a. Visit a medical doctor, general practice					
b. Visit a medical doctor, specialist					
c. Visit a dentist					

APPENDIX B

Definition of Income Levels

Utilization of health services is frequently considered to be associated with the income of the household. Income in this study was defined to include all work earnings of persons 12 years old or over plus household retirement, disability, interest, rents, social security, and income transfer payments received (such as Aid to Families with Dependent Children and the bonus value of food stamps) during the 1974 calendar year. 1/ For ease of comparison, households were divided into low- and high-income categories on the basis of "income and family size" using criteria established by the U.S. Bureau of the Census. The income thresholds which distinguished between a low-income and a high-income household are reported below.

Maximum Income for Low-Income Households 2/

Family Size	Total Income
1	$2,487
2	$3,191
3	$3,910
4	$5,008
5	$5,912
6	$6,651
7 or more	$8,165

1/ The construction of household income for 1974 parallels the procedure used for a study of labor adjustments using the same data base for both 1972 and 1974. The methodology for estimating 1972 household income is identified in Dale M. Hoover and Leon B. Perkinson, Flue-Cured Tobacco Harvest Labor: Its Characteristics and Vulnerability to Mechanization, Economic Research Report No. 38, Department of Economics and Business, N.C. State University, Raleigh, June 1977.

2/ Source: U.S. Bureau of the Census, Current Population Reports, Series P-60, No. 102, "Characteristics of the Population Below the Poverty Level: 1974," Supt. of Docs., U.S. Govt. Print. Off., Washington, D.C., 1976, p. 145.